

Listing of Claims:

1. (Previously presented) A computer-implemented method for biometric authentication, said method comprising:

reading a first unique, heartbeat waveform of an individual;

analyzing said waveform to identify unique traits;

reading a second unique, internal physiological trait of said individual; and

authenticating the identity of said individual if both said waveform and said physiological trait correspond with previously enrolled traits recorded for said individual.

2. (Canceled)

3. (Previously presented) The method of claim 1 wherein said first unique, heartbeat waveform is measured by reflecting light off of the subdermal layers of skin tissue on said individual.

4. (Canceled)

5. (Previously presented) The method of claim 1 wherein said step of authenticating is performed by a portable computerized device.

6. (Original) The method of claim 5 further comprising weighting some quantitative features of said biological traits more than other quantitative features of said biological traits.

7. (Original) The method of claim 6 further comprising means for verifying physiological activity.

8. (Previously presented) The method of claim 1 wherein said second unique, internal physiological trait comprises the light absorption characteristics of the skin tissue of said individual.

9. (Original) A method comprising:

reading a first live internal biological identifier of an individual, said first live internal biological identifier being a heartbeat waveform measured by reflecting light off of the subdermal layers of skin tissue on said individual;

reading a second live internal biological identifier of said individual; and

authenticating the identity of said individual if both of said biological identifiers correspond with previously enrolled biological identifiers taken for said individual.

10. (Original) The method of claim 9 wherein said second live internal biological identifier comprises the depth of a previously-identified layer of epithelial tissue.

11. (Previously presented) A method comprising:
- reading a first live internal biological identifier of an individual, said first live internal biological identifier being a heartbeat waveform measured by reflecting light off of the subdermal layers of skin tissue on said individual;
 - analyzing said waveform to identify unique traits;
 - reading a second live internal biological identifier of said individual, said second live internal biological identifier comprising bone density; and
 - authenticating the identity of said individual if both of said biological identifiers correspond with previously enrolled biological identifiers taken for said individual.
12. (Original) The method of claim 9 wherein said second live internal biological identifier comprises the retinal pattern of an iris.
13. (Original) The method of claim 9 wherein said method is performed by a single computer chip.
14. (Original) The method of claim 13 wherein said single computer chip is incorporated into a personal digital assistant.
15. (Original) The method of claim 9 further comprising weighting some quantitative features of said biological identifiers more than other quantitative features of said biological identifiers.

16. (Previously presented) A method comprising:
presenting an individual's live body tissue to an authenticating device for the capturing of a first unique, heartbeat waveform of said individual;
analyzing said waveform to identity unique features;
providing a second unique, internal physiological identifier of said individual to said authentication device;
authenticating said second physiological identifier by comparing the unique features with those recorded for that individual; and
upon authentication by said device, operating said device to perform functions previously inaccessible to unauthorized individuals, said authentication taking place upon the matching of both of said biological identifiers with previously enrolled physiological identifiers taken for said individual.

17. (Previously presented) The method of claim 16 wherein said second unique, internal physiological identifier comprises the light absorption characteristics of the skin tissue of said individual.

18. (Original) The method of claim 16 wherein said authentication is performed by a single computer chip.

19. (Original) The method of claim 16 wherein said authentication further comprises weighting some quantitative features of said biological identifiers more than other quantitative features of said biological identifiers.

20-27. (Canceled)

28. (Currently amended) A computer-readable storage medium comprising instructions to cause a computing device to perform a method, comprising [[for]]:
reading a unique heartbeat waveform of an individual;
analyzing said waveform to identify unique traits;
reading a second unique, internal physiological identifier of said individual; and
authenticating the identity of said individual if both said waveform and said physiological identifier correspond with previously enrolled identifiers recorded for said individual.

29. (Currently amended) The computer-readable storage medium of claim 28₁ wherein said second internal physiological identifier comprises the depth of a previously-identified layer of epithelial tissue.

30. (Canceled)

31. (Currently amended) The computer-readable storage medium of claim 28₁ wherein said second internal physiological identifier comprises the retinal pattern of an iris.

32. (Currently amended) The computer-readable storage medium of claim 28, wherein said instructions are performed by a single computer chip.

33-34. (Canceled)

35. (Previously presented) A layered biometric authentication system comprising:

a portable computerized device having an infrared emitter and detector operably connected to a single computer chip;

means for capturing a first unique heartbeat waveform of an individual, said means being located on said portable device and operably connected to said computer chip, said waveform being measured by reflecting light off of the subdermal layers of skin tissue on said individual;

means for analyzing said waveform to identify unique traits;

means for capturing a second internal physiological identifier of said individual, said means for reading the second biological identifier being located on said portable device and operably connected to said computer chip;

means for verifying physiological activity, said verifying means being operably connected to said computer chip; and

means for authenticating the identity of said individual if both of said waveform and said physiological identifier correspond with previously enrolled identifiers recorded for said individual, said means for authenticating weighting some quantitative features of said identifiers more than other quantitative features of said identifiers.

36. (Previously presented) The medium of claim 28 wherein said second unique, internal physiological identifier is measured by reflecting light off of the skin of said individual.

37. (Previously presented) The medium of claim 28 wherein said second unique, internal physiological identifier comprises the light absorption characteristics of the skin tissue of said individual.

38. (Previously presented) The computer-implemented method of claim 1, wherein analyzing said heartbeat waveform includes filtering and normalizing the heartbeat waveform.

39. (Previously presented) The computer-implemented method of claim 1, wherein analyzing said heartbeat waveform includes analyzing a dicrotic notch.

40. (Previously presented) The computer-implemented method of claim 1, wherein analyzing said heartbeat waveform includes analyzing two peak amplitudes.

41. (Previously presented) The method of claim 11, wherein analyzing said heartbeat waveform includes filtering and normalizing the heartbeat waveform.

42. (Previously presented) The method of claim 11, wherein analyzing said heartbeat waveform includes analyzing a dicrotic notch.

43. (Previously presented) The method of claim 11, wherein analyzing said heartbeat waveform includes analyzing two peak amplitudes.

44. (Previously presented) The method of claim 16, wherein analyzing said heartbeat waveform includes filtering and normalizing the heartbeat waveform.

45. (Previously presented) The method of claim 16, wherein analyzing said heartbeat waveform includes analyzing a dicrotic notch.

46. (Previously presented) The method of claim 16, wherein analyzing said heartbeat waveform includes analyzing two peak amplitudes.

47. (Previously presented) The computer-readable medium of claim 28, wherein analyzing said heartbeat waveform includes filtering and normalizing the heartbeat waveform.

48. (Previously presented) The computer-readable medium of claim 28, wherein analyzing said heartbeat waveform includes analyzing a dicrotic notch.

49. (Previously presented) The computer-readable medium of claim 28, wherein analyzing said heartbeat waveform includes analyzing two peak amplitudes.

50. (Previously presented) The layered biometric authentication system of claim 35, wherein means for analyzing includes means for filtering and normalizing the heartbeat waveform.

51. (Previously presented) The layered biometric authentication system of claim 35, wherein means for analyzing includes means for analyzing a dicrotic notch.

52. (Previously presented) The layered biometric authentication system of claim 35, wherein means for analyzing includes means for analyzing two peak amplitudes.